



Innovative Technology Shaping Accounting

Senior Project

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Courtney Gunnells
Accounting
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Courtney Gunnells
Honors College Scholar

Date

Joseph Lakatos
Faculty Mentor

Date

Joshua Kalin Busman, Ph.D.
Senior Project Coordinator

Date

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Abstract

There are many technological advancements that have impacted and will continue to change the field of Accounting, Auditing, and Taxation. Technology has increased simplification of accounting tasks, provided for more accurate information, improved internal controls, changed accounting costs, affected accounting positions, and increased fraud detection and prevention. This paper will examine the effects on the industry due to accounting software, Cloud Accounting, Blockchain, Robotic Process Automation, and Artificial Intelligence. These are the five latest technologies that have had the greatest impact on accounting. They will continue to change the field as they are developed and implemented further.

Innovative Technology Shaping Accounting

Importance of Accounting

Accounting is defined by the American Institute of Certified Public Accountants as “the art of recording, classifying, and summarizing in a significant manner and in terms of money, transactions and events which are, in part at least of financial character, and interpreting the results thereof” (AccountingVerse.com, 2018). Accounting assists businesses in various activities: documentation of transactions, keeping track of inventory, assessments, calculations, account balances, and reporting (Slyozko, 2018). As a result, it is also a major component of the economy. There are many users of the accounting financial statements that benefit from a company’s information being presented fairly and in an efficient manner. Investors, managers, employees, and the general public rely on accounting. Businesses need accurate and timely information regarding the finances so that managers can make decisions, improve the business’ profits, and manage its cash flows (Sonji et al., 2018). There have been many improvements to the accounting field since the development of computers in the 1970s and accounting information systems in the 1980s (Singerová, 2018).

Accounting Software

For most businesses, dozens of transactions must be recorded every day. Prior to the invention of accounting software, this meant that each transaction had to be handwritten in paper records. Which made for unreliable information due to the possibility of mistakes or fraud. Software minimizes these risks, resulting in

more accurate information for the stakeholders of the business. Accounting bookkeeping software can manage financial transactions, create reports, and identify cash flows (Arrowsmith, 2018). Software programs also help accountants comply with the Generally Accepted Accounting Principles (GAAP) and allow many companies to go paperless, which reduces costs.

The accounting profession is undergoing a change as a result of accounting software and other technologies. By utilizing software, accountants spend less time keeping records. This allows them to provide value to companies through higher-order critical-thinking skills (Hunton, 2002). Accounting professionals are moving away from the “number-cruncher” or “bean counter” roles by reducing the amount of manual data entry (Chandi, 2018). The use of software also caused a transition from the need for accountants to post transactions to the need for accountants to review transactions. Because of this, the implementation of software generally did not change the amount of accounting staff for businesses (Wilkinson, 2013). Instead of laying off accountants due to the implementation of technology, their roles in the business were simply transformed.

Accounting software usage rates are very high among accounting firms. “Virtually all firms of all sizes use tax preparation and write-up/bookkeeping software” (Drew, 2015). 33% to 42% of firms of all sizes replace software when a better alternative becomes available (Drew, 2015). This means that many accounting firms are not only using software, but also looking out for the latest and greatest versions.

Implementing software brings added costs to a business. “Costs can start as low as \$9 and as high as \$500 per user per month, while one-time license fees start around \$499. For more advanced accounting systems and more users, you can expect to pay closer to \$375 per user per month, or \$1,000+ for a license” (Short, 2019). The change also brings the need for accountants to become trained in the new software. There are many kinds of accounting software available for accountants to use. Some of the most common are QuickBooks, Xero, and FreshBooks Cloud Accounting (Edwin, 2019). These can now be accessed online, through cloud accounting. The target users for QuickBooks online are small to medium-sized businesses. For smaller companies, making the change from paper ledgers to a electronic records will be an easier transition than for larger companies. It will require much more money and effort to transition different locations, each with dozens of employees (Agyekum & Singh, 2018). But many companies are finding the transition is worth the extra money, time, and effort. QuickBooks Online hit 2 million subscribers worldwide in 2017 (Chandi, 2018). The global market for accounting software subscriptions will reach \$11.8 billion by 2026 (Arrowsmith, 2018). This number is based on an expansion rate of about 8.6% per year (Arrowsmith, 2018).

It is important for auditors to ensure that they use the most modern resources to provide the most efficient and effective audit for stakeholders (Stanton, 2012). Utilizing software during an audit can strengthen the security of the data collected and eliminate human errors. It can also allow auditors to generate reports and visuals quickly. Software is also used by auditors to detect accounting fraud

(Jones, 2017). There are software packages that trace data so that auditors can validate it in the reporting or during quality reviews. This allows a complete audit trail to be documented in one system. “The role of an auditor is changing rapidly, and the use of technology-based audit tools is the only way for the auditor to ensure an effective audit” (Stanton, 2012). Like with other accounting and bookkeeping roles, the role for auditors has shifted with the invention of software specifically for auditing.

Tax software turned a process that used to take hours into one that can take minutes (Martins, 2019). Having all the data for a business collected throughout the year and available in one place increases simplicity, accuracy, and speed for tax forms and payments (Gerber, n.d.). Most software programs will transfer information from the federal return to the state tax return which prevents the need for re-entering it. Software checks for errors before sending information to the IRS (Martins, 2019). And it keeps track of the latest changes in tax law. It automatically checks for deductions or credits that may be applicable (Martins, 2019). Utilizing software is also less expensive than hiring a tax professional. The tax information can be stored on the computer and accessed for any year at any time that it is needed.

A global survey of 900 CFOs, finance directors, and accountants around the world in mid-sized and large businesses, found that accountants believe accounting software and cloud accounting, will have the largest impact on the accounting profession during the next five years (Arrowsmith, 2018). The future of accounting

software is online, or “cloud” based (Drew, 2015). This is software that is available online from any location.

Cloud Accounting

The term cloud accounting is also referred to as online accounting, web accounting, and virtual accounting (Đorđević et al., 2018). Cloud accounting is one of the most important accounting information systems developments (Singerová, 2018). The invention of cloud accounting brought multiple improvements to traditional accounting software. It allows multiple employees to simultaneously access information, store data, and use applications through the internet from any device. Large companies usually use dedicated servers or private clouds while small and medium size companies use software services (Singerová, 2018) where the data is stored on third-party servers, which charge a fee to the business (Soni et al., 2018). Cloud-based accounting technology has been around for over a decade and, like any technology, has improved over time (Arrowsmith, 2018). Before cloud accounting, accounting data was limited to the specific computer that it was saved to. With cloud accounting, the data can be accessed anywhere which is very beneficial, to large companies and firms especially.

Cloud accounting brings multiple benefits to the accounting profession and to the business itself. Accountants can work from any location and at any time. This allows for more flexible work schedules, the option to work from home, and the ability to meet client demands quicker. Switching to cloud accounting helps the business stay competitive in the global business environment (Akar, 2012). The

business information is updated automatically, for the users to see, in real time. It eliminates the need for data from physical hard drives to be backed up or stored in other locations which takes up valuable time (Ziff, 2018). It also prevents the need for installing and maintaining the software on each individual business computer. The issue of incompatibility between software and computer system is erased which allows for seamless communication no matter which computer system is used. Accounting data can be shared easily and worked on by multiple employees at once. The company's information can be accessed remotely by employees from different locations or branches. This makes communication, collaboration, and cooperation easier between accountants. The recording of transactions automatically through the cloud accounting allows for compliance with a company's internal controls as well as accounting standards. The software can be adapted for the needs of the business. There is also cloud accounting specifically for small and medium sized businesses, which was previously mentioned in the accounting software section. Lost, stolen, or damaged computers does not result in the loss of the accounting data because it is saved online.

Utilizing cloud accounting for tax helps accountants' complete tasks faster and for lower costs. Individual and business taxpayers benefit from online reporting and mobile applications (Singerová, 2018). For auditors, cloud accounting reduces the cost of the audit. It reduces paper usage and makes storing and sharing data easier (Singerová, 2018). It also increases risks for a business and auditors must take these risks into account. Some of the main risk factors include greater dependency on third parties, reliance on the internet, increased risk in data centers

(Singerová, 2018). Audit procedures must be created to cover the technological risks, data protection, and operational processes related to cloud accounting in the business.

The most common reasons for businesses not adopting cloud solutions are security, risk of losing data, and lack of information (Singerová, 2018). Cyber security breaches are not uncommon (Moffitt et al, 2018). There is the risk of hackers, viruses, and employees compromising the database (Hunton, 2002). If a company, especially an accounting firm is breached and loses confidential client information it can harm its reputation and possibly result in litigation (Moffitt et al, 2018). However, if the data is stored on physical hard drives it is more susceptible to corruption, theft, or destruction that results in the loss of vital business information. With cloud accounting, if cybercrime does occur, the 24/7 transparency that cloud accounting provides will allow it to be identified quicker than a system that is not online and real-time (Arrowsmith, 2018). There are frequent and automatic security updates to prevent viruses and hacking. Businesses must also have knowledge of the technical aspects of implementing the system and of the system contract. However, the implementation of cloud accounting is much faster and easier than the process for implementing traditional accounting software (Singerová, 2018). Like with any technology, accountants must be trained to use the cloud software. However, there is usually a step-by-step guide and video tutorials which makes this process much easier (Ziff, 2018).

Cloud accounting brings an added cost to the business; however, the costs of the accounting department can also be reduced through utilizing cloud accounting.

The costs for traditional software include the software license, maintenance, software upgrades, IT resources, training, data continuity and security, customization, and implementation fees (Mahoney, 2013). While cloud computing has lower total costs including the subscription fee, implementation, customization, and training fees (Mahoney, 2013). Like, with traditional accounting software, cloud accounting allows for the accounting department to go paperless, which reduces costs associated with paper and printing. Accountants can access the accounting system through using their own devices and an internet connection. There would be no need to spend on hardware, repair, and maintenance, just the fees for the cloud accounting software and internet (Ziff, 2018).

Robotic Process Automation

Robotic Process Automation (RPA) is software that has been preconfigured to reproduce human tasks (Moffitt et al, 2018). The types of tasks that can be replaced with robotic automation are repetitive, high volume tasks like payroll, accounts payable, accounts receivable, invoice processing, and calculation of credit on a customer account. Tasks that are less appropriate for RPA are those that are less repetitive, have uncertain results, and need human judgement. RPA can be used to reconcile and spit out exceptions for humans to review (The Lab Consulting, 2018). There are vendors that supply RPA software like AutomationEdge, Automation Anywhere, Blue Prism, Kryon Systems, Softomotive, and UiPath (Van der Aalst, Bichler, & Heinzl, 2018). And a robot can be installed in less than a week (The Lab Consulting, 2018).

RPA can also be used to automatically process tax entries into Quickbooks software from spreadsheets which reduces transcribing tasks (The Lab Consulting, 2018). RPA for auditing services remains in its early stages due to the highly regulated nature of audit services for public companies (Rozario & Vasarhelyi, 2018). But RPA is predicted to replace manual and mundane audit tasks and improve audit efficiency and effectiveness (Rozario et al., 2018). Auditing tasks that do not require auditor judgment can be automated and leave auditors to analyze the differences generated by the RPA software (Rozario et al., 2018). Some specific tasks that RPA could accomplish for accountants include tracking annual audit plan progress, monitoring risk factors, evaluating the quality of data, checking for duplicates and validation, sending emails, sending follow-ups when due dates are not met (PwC, 2017).

If the robots have been created perfectly, their work will produce error free results. This increases the reliability of accounting information. The use of RPA can result in the improvement of processes and economies of scale for businesses. The work can also be done much quicker than humanly possible. Which speeds up processes for clients or customers, like purchase-order-to-fulfillment time, which improves the quality of the business. The robots also leave records of what was accomplished. RPA can be used to transfer, reconcile, and cross reference data from different systems (EY, 2018). But it cannot be used for unstructured data like scanned documents. The data must be processed, which remains a task for accountants (Gotthardt, 2019). RPA can make company operations more competitive with increased economic value, workforce advantages, increased

quality, increased speed of processes (PwC, 2017). It can reduce risks by increasing compliance and accuracy. The robot always performs the task without errors, bias, or variations (PwC, 2017). But RPA will introduce risks to the company if it is not controlled and monitored (PwC, 2017). If unauthorized access is gained it could result in fraud.

Some businesses are reluctant to utilize RPA because they are afraid it will impact employee positions negatively. One concern with RPA is the potential for human accounting jobs to be replaced or for businesses to expand without needing to hire more accountants. With the simpler, repetitive tasks performed through RPA, this leaves accountants more time and resources to put towards the more complicated tasks. It is argued by Santos (2003) that technology does not create an alternative to accounting, it enhances it. Technology does not provide everything that managers need to know for decision making. Accountants must interpret the information.

The implementation of RPA systems is only beginning. "Only 15 percent of companies consider themselves mature in their use of RPA" (PwC, 2017). This is partly due to the fact that there is a general lack of understanding by accountants of RPA and its capabilities (Gotthardt, 2019). With the implementation of RPA, there also comes the cost of training accountants in how to use the software. And the added fixed and variable costs associated with purchasing or developing the software that is difficult for small businesses to afford. But it is an added benefit for the businesses that use it.

Artificial Intelligence

While Robotic Process Automation assists in structured tasks, Artificial Intelligence can benefit less structured tasks (Marshall et al., 2018). It combines other technologies like data mining, machine learning, speech recognition, image recognition, and semantic analysis (Gotthardt, 2019). AI can discover patterns, find relevant information, learn from data to make decisions, detect fraudulent transactions, and can create text or speech from information to create financial analysis reports (Gotthardt, 2019). Some examples of scenarios in which AI may be helpful for accountants include evaluating risk, expense, and profit for an audit engagement, suggesting procedures for assessing IT internal controls based on GAAS, or recommending that a client provide supporting documentation for certain transactions (Marshall et al, 2018). Another example of AI automating tedious tasks is provided by Blake Oliver, senior product marketing manager at FloQast, “One of our accountant beta testers was able to automate 97 percent of his deferred revenue account reconciliation using our solution, that’s a task that previously took him a solid day or two each month. Now it takes him about 10 minutes” (English, 2019).

Examples of AI utilization in auditing include letting AI select a sample of accounts receivables for the auditors to confirm and performing statistical analysis. Also, AI could test segregation of duties and access controls over accounts receivables that the auditor confirms (Marshall et al, 2018). Regarding fraud, the AI system could identify fraud risks and recommend audit tests (Marshall et al, 2018). Internal auditors can automate tasks like testing controls, which frees them up for activities that create more value for the company (Gotthardt, 2019). Automated

tests during audits allows for the full data population to be tested. This makes auditing more accurate (Gotthardt, 2019). Artificial intelligence and machine learning use for anti-fraud programs in organizations is expected to almost triple over the next two years according to the ACFE Anti-Fraud Technology Report (2019). AI for auditors will allow them to run data analytics on the general ledger instead of only testing a sample of data (Greshner, 2019). How clients are implementing AI will change the risk assessment of the business and auditors will have to take this into account (English, 2019). Tax authorities and advisors are starting to look for ways to utilize artificial intelligence to assist them and promote compliance (Hählen & Dieusaert, 2019).

AI helps accountants solve problems and does not necessarily replace their jobs, but the accounting positions will be altered (Marshall et al, 2018). With unstructured tasks also automated through AI, it allows accountants to perform other activities that add more value to the company (Marshall et al, 2018). The accounting role in the business has advanced with the increase in technology. Now accountants have the free time to assist management with decision making and solving problems (Fisher, 1997). The traditional role of only recording and preparing financial statements have been mostly taken over by technology. Repetitive accounting tasks that are usually performed by junior staff is beginning to be taken over by robots. And humans are needed at a higher level (Gotthardt, 2019). Now accountants use higher-order critical thinking skills (Hunton, 2002).

Like many of the latest accounting technologies, the implementation of AI systems is in the beginning phase. Only 5 percent of companies consider themselves

mature in their use of AI (PwC, 2017). PwC estimated that \$2 trillion in global workforce costs every year can be saved by automating 45% of work activities (PwC, 2017). AI can result in money saved and productivity gained. And it is predicted that automation will have one of the highest impacts on accounting in the short term (Gotthardt, 2019).

Blockchain

Blockchain is also called Distributed Ledger Technology and is the “underlying technology in Bitcoin cryptocurrency” (Nordgren et al., 2019). Blockchain provides a platform for parties to make transactions and keep records. It has the potential provide for the accounting industry transparency, fraud prevention, and time and money saved through the elimination of intermediaries, utilization of smart contracts, and enhanced security for transactions. (Nordgren et al., 2019).

Traditionally, when two businesses make a trade, they record that transaction in their own books, and with Blockchain, both parties can also record their side of the transaction in the same block. This prevents errors and wasted time because it allows for everyone to have real-time, correct information which is important as we are living in the “now economy” (Vasarhelyi & Alles, 2008). Stakeholders can view transactions that are posted to public ledgers and this provides greater transparency (Cong et al., 2018). Real-time balance sheets, income statements, labor reports, inventory records, patent applications, and much more information could be created and shared with Blockchain (Cong et al., 2018). This

would be valuable information to partners, clients, auditors, tax authorities, and regulators. More frequent reporting may impact stock price valuations and market volatility (Hunton, 2002). Because of the timestamp and hash ID, Blockchain provides an audit trail for auditors (Nordgren et al., 2019). Smart contracts are enabled through Blockchain and these are contracts that are tamper proof and are automatically executed. When the first event happens, the smart contract automatically triggers the subsequent events for the contract to be completed.

When accessing the Blockchain database, the ID of each of the blocks must match the hash ID of the same block in the other computers in the network. When over 51% of the computers verify that the hash ID is the same, and both of the parties in the transaction verified the new transactions, then a new block can be added. The blocks cannot be altered once they are created. A new block must be created with the right information. Which makes correcting errors more difficult for accountants but makes fraud more difficult. Hacking is still a concern with Blockchain. If a hacker gets 51% control, which is difficult but still possible, they can manipulate the Blockchain system. Security measures can be implemented, however, to protect Blockchain. Another issue with Blockchain is that it creates more work in the short term, when it is first implemented many transactions must be recorded (English, 2019). Other issues for accountants to consider with real-time reporting are accruals, deferrals, and estimates (Hunton, 2002).

The audit and assurance industry will face new challenges when it comes to auditing businesses that utilize blockchain. Some think that blockchain will eliminate the financial statement audit, however, a transaction being recorded in a

blockchain does not provide sufficient audit evidence regarding that transaction (AICPA, 2018). For example, a blockchain transaction that is recording payment for a product does not provide evidence that the product was actually delivered. Transactions in in a blockchain could also be illegal, between related parties, part of side agreements, or classified incorrectly (AICPA, 2018). CPAs will have to be knowledgeable blockchain in order to fully understand it and the added risks that it brings to a business. They will have to create new procedures and techniques for gathering audit evidence from the blockchain (AICPA, 2018). They will also have to consider the traditional general ledger and the blockchain ledger if both are used by a client. When gathering data from the blockchain, auditors will have to determine if it is reliable considering the general technology controls and the protocol for the specific blockchain (AICPA, 2018). Because it is new, there may be unique characteristics for each blockchain implementation and auditors must be aware of these differences in order to address them properly in the audit procedures (AICPA, 2018). As blockchain becomes more widely used, auditors may be able to develop software to continuously audit the blockchain, making the audit more efficient and effective (AICPA, 2018). If auditors can automate tasks, it allows them to focus on the more complex and risky transactions

The creation of virtual currencies, like those that can be used in blockchain transactions, has created another element for accountants to keep track of and pay taxes on. The IRS issued Notice 2014-21, IRB 2014-16, to guide those performing transactions in virtual currencies. The notice applies to “convertible” virtual currency that can be exchanged into real currency like U.S. dollars. Generally, selling

and exchanging virtual currency, using it to pay, and holding it as an investment creates tax consequences. It is treated as property and the general tax principles that apply to property transactions also apply to transactions that use virtual currency. When a taxpayer receives it as payment for goods or services it is included in gross income at the fair market value on the date it was received. CPAs must be aware of these tax consequences and rules in order to advise clients that use or consider using virtual currency.

Blockchain is still being developed but it is predicted that the fields to be most interrupted by Blockchain are accounting and finance. Financial intermediaries are now competing with cryptocurrencies and Blockchain financial services. All of the Big 4 Accounting Firms are either testing or already using Blockchain in some way (Nordgren et al., 2019). Ernst & Young was the first to accept Bitcoin as a payment method (Vetter, 2018). Deloitte launched Rubix in 2014 (Vetter, 2018) which is a blockchain software platform. And Deloitte stated that Blockchain would eventually fully automate the audit (English, 2019). PwC released the first Blockchain auditing service to ensure that companies are using Blockchain correctly and effectively (Vetter, 2018). However, In the ACFE Anti-Fraud Technology survey, only 9% of organizations surveyed use blockchain or robotics as a part of their anti-fraud programs (ACFE, 2018). One day applying blockchain to tax could reduce the cost and burden on the administration while collecting taxes (PricewaterhouseCoopers, n.d.). Blockchain may allow tax authorities to have more oversight and collect earlier (PricewaterhouseCoopers, n.d.).

Some are concerned Blockchain will replace humans, but it is unlikely (Vetter, 2018). The president and CEO of CPA.com, Erik Asgeirsson, said “what’s really happened is the accountant’s and auditor’s role has just evolved” (Vetter, 2018). Accountants must be able to adapt to these technological changes and advancements.

Conclusion

According to the U.S. Bureau of Labor Statistics, there is a projected 10 percent increase between 2016 and 2026 in accountant and auditor employment (Maryville University, 2019). And accounting technology will continue to develop and change the accounting industry for the better, largely through software, cloud accounting, robotic process automation, AI, and blockchain. In order to understand the new integrated technology and learn analysis techniques, additional education will be critical for accountants (Maryville University, 2019). Accountants will have to evolve with the changes or risk being left behind. CPAs also have the opportunity to become knowledgeable about these technologies and use their knowledge to provide guidance to businesses (AICPA, 2018).

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